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In-plane magnetic penetration depth of superconducting CaKFe4As4

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Abstract

© 2018 American Physical Society. The temperature dependence of the in-plane magnetic penetration depth (λab) in an extensively characterized sample of superconducting CaKFe4As4(Tc≃35K) was investigated using muon-spin rotation (μSR). A comparison of λab-2(T) measured by μSR with the one inferred from angle-resolved photoemission spectroscopy (ARPES) data confirms the presence of multiple gaps at the Fermi level. An agreement between μSR and ARPES requires the presence of additional bands, which are not resolved by ARPES experiments. These bands are characterized by small superconducting gaps with an average zero-temperature value of Δ0=2.4(2)meV. Our data suggest that in CaKFe4As4 the s± order parameter symmetry acquires a more sophisticated form by allowing a sign change not only between electron and hole pockets, but also within pockets of similar type.

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